Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) An array receiver for processing signals received from a plurality (M+1) of transmitting users via an array antenna having an array of (N) antenna elements providing a corresponding set of (N) antenna signals (x_1, x_2,..., x_N), respectively, where N is at least equal to the number of users, each of the antenna signals (x_1, x_2,..., x_N) comprising information from each of the plurality (M+1) of users, to obtain a set of user-specific estimated received signals (z_0,..., z_M) each corresponding to a respective one of said transmitting users,

wherein said receiver has

a common preprocessing section for sampling each of the (N) antenna element signals (x_1, x_2,..., x_N) and processing the samples of at least some of said antenna signals to form a plurality of (M+1) basis signals (y_0..., y_M), each having R dimensions, said (M+1) basis signals together having fewer space-time dimensions (Rx(M+1)) than the space-time dimensions (NxL) of the (N) combined antenna signals, where L is the maximum of the channel impulse response in symbol periods, and

a plurality (M+1) of signal processing units (60_0,..., 60_M) for processing said basis signals to form said set of (M+1) user-specific estimated received signals (z_0, z_1,... z_M), each signal processing unit having a plurality of inputs coupled to the common preprocessing section for receiving all of the (M+1) basis signals, each signal processing unit processing and combining at least some of said (M+1) basis signals (y_0,..., y_M) to produce a respective one of said [[a]] set of user-specific estimated received signals (z_0,..., z_M) ~~each~~ for a corresponding desired one of the plurality (M+1) of transmitting users,

the common preprocessing section comprising

filtering means (40) for combining all of the antenna signals (x_1, x_2,..., x_N) to provide said plurality of basis signals (y_0,..., y_M), each of the basis signals (y_0,..., y_M) comprising a different combination of the antenna signals,

~~each of the signal processing units combining the basis signals to provide a user-specific output signal,~~

and updating means for periodically updating parameters of the filtering means used for deriving each particular basis signal such that each of the user-specific estimated received

signals (z_0, z_1,... z_M) ~~user-specific output signal~~ will exhibit a desired optimized concentration of energy ~~of that desired user's received signal as received by the array antenna.~~

2. (Previously presented) A receiver according to claim 1, wherein the updating means comprises means for adjusting said parameters in dependence upon channel characteristics of all user channels.

3. (Previously presented) An array receiver for processing signals received from a plurality of transmitting users via an array antenna having an array of *N* antenna elements providing a set of antenna signals (x_1, x_2,..., x_N), respectively, each comprising information from each user,

wherein said receiver has

a common preprocessing section for sampling each of the antenna element signals (x_1, x_2,..., x_N) and processing the samples of at least some of said antenna signals to form a plurality of basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) together having fewer space-time dimensions than the space-time dimensions of the combined antenna signals, and

a plurality of signal processing units each having a plurality of inputs coupled to the common preprocessing section for receiving all of the basis signals, each processing unit processing and combining said basis signals to produce a respective one of a set of estimated received signals (z_0,..., z_M) each for a corresponding desired one of the users,

the common preprocessing section comprising

filtering means for combining all of the antenna signals (x_1, x_2,..., x_N) to provide said plurality of basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$), each of the basis signals comprising a different combination of the antenna signals,

each of the signal processing units combining the basis signals to provide a user-specific output signal,

and updating means for periodically updating parameters of the filtering means used for deriving each particular basis signal such that each user-specific output signal will exhibit a desired optimized concentration of energy of that desired user's received signal as received by the array antenna, and

wherein each of the processor units comprises means for weighting the basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$)

before combining same, the weights (w_{00},..., w_{MM}) being adjusted in dependence upon channel characteristics of all user channels,

and the parameters of the filtering means are updated less frequently than the weights (w_{00},..., w_{MM}) of the processor units.

4. (Previously presented) A receiver according to claim 1, wherein the number of basis signals is equal to the number of desired user signals.

5. (Currently amended) A receiver according to claim 1, wherein the common preprocessing section comprises M+1 dominant subspace filters producing a set of basis signals $\mathbf{y}_m = [y_{m,1}, ..., y_{m,\mu}]$ where m is the index of the filter, and m = 0, 1, ..., M, said basis signals $\mathbf{y}_m$ being projections of the input signals (x_{11}, x_{12}, ..., x_{1L}, x_{21}, x_{22}, ..., x_{2L}, ..., x_{N1}, x_{N2}, ..., x_{NL}) onto the [[μ]] R dimensions of the subspace occupied by signal m which carry the most energy.

6. (Previously presented) An array receiver for processing signals received from a plurality of transmitting users via an array antenna having an array of *N* antenna elements providing a set of antenna signals (x_1, x_2,..., x_N), respectively, each comprising information from each user,

wherein said receiver has

a common preprocessing section for sampling each of the antenna element signals (x_1, x_2,..., x_N) and processing the samples of at least some of said antenna signals to form a plurality of basis signals ($\mathbf{y}_0$,..., $\mathbf{y}_M$) together having fewer space-time dimensions than the space-time dimensions of the combined antenna signals, and

a plurality of signal processing units each having a plurality of inputs coupled to the common preprocessing section for receiving all of the basis signals, each processing unit processing and combining said basis signals to produce a respective one of a set of estimated received signals (z_0,..., z_M) each for a corresponding desired one of the users,

the common preprocessing section comprising

filtering means for combining all of the antenna signals (x_1, x_2,..., x_N) to provide said plurality of basis signals ($\mathbf{y}_0$,..., $\mathbf{y}_M$), each of the basis signals comprising a different combination of the antenna signals,

each of the signal processing units combining the basis signals to provide a user-specific

output signal,

and updating means for periodically updating parameters of the filtering means used for deriving each particular basis signal such that each user-specific output signal will exhibit a desired optimized concentration of energy of that desired user's received signal as received by the array antenna,

wherein the updating means comprises

a training sequence generator for generating a training sequence for the corresponding user,

covariance matrix estimation means responsive to the training sequence and the antenna signals for providing a covariance matrix embodying long-term statistics for the channel of that user, and

eigenvector estimation means for extracting from said covariance matrix at least the dominant eigenvector constituting said linear combination, elements of said dominant eigenvector being applied to said filtering means as weights for updating said parameters.

7. (Currently amended) A receiver according to claim 1, wherein the filtering means comprises a plurality of filters each comprising a filter matched to a respective one of the space-time channel characteristics of the desired users.

8. (Previously presented) A receiver for receiving signals from a plurality of transmitting users via an array antenna having an array of N antenna elements providing a set of antenna signals (x_1, x_2, ... x_N), respectively, each comprising information from each user, said receiver comprising a common preprocessing section followed by a plurality of receiver sections, each corresponding to a different one of the users and coupled to the outputs of the common preprocessing section, the preprocessing section sampling each of the antenna signals (x_1, x_2,..., x_N) and processing the samples of at least some of said antenna element signals to form a plurality of basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) together having fewer space-time dimensions than the space-time dimensions of the combined antenna signals, and a plurality of signal processing units each having a plurality of inputs coupled to the common preprocessing section for receiving all of the basis signals, each processing unit processing and combining said basis signals to produce a respective one of a set of estimated received signals (z_0,..., z_M) each for a corresponding desired

one of the users,

the common preprocessing section comprising

(i) means for maintaining through periodic updates a set of dominant subspace filters, each of which being matched to one of the users of interest, and the outputs of which being used by the subsequent receiver sections, to be processed and combined in order to yield an estimate of the desired signal for each user of interest;

(ii) means for periodically estimating and/or updating the component weights of the dominant subspace filters by correlation, with a known training sequence or with the user's spreading code in a CDMA system or with any other signal strongly correlated with the user of interest's signal, in combination with appropriate temporal averaging to isolate subspace-level information, as opposed to instantaneous channel characteristics; and

(iii) means for periodically or dynamically estimating and/or updating the component weights and/or any other parameters of interest of the receiver sections fed from the preprocessing section in a manner and at a rate such that instantaneous channel changes are tracked to provide a reliable and consistent estimate of the desired signal.

9. (Currently amended) An array receiver system comprising an array antenna comprising a plurality (N) of antenna elements in combination with an array receiver for processing signals received from a plurality (M+1) of transmitting users via said array antenna, said ~~array antenna having N~~ antenna elements for providing a corresponding set of (N) antenna signals (x_1, x_2,..., x_N), respectively, each comprising information from each of the plurality of (M+1) users, to obtain a set of user-specific estimated received signals (z_0,..., z_M) each corresponding to a respective one of said transmitting users [[~~user~~]],

wherein said receiver has

a common preprocessing section for sampling each of the (N) antenna element signals (x_1, x_2,..., x_N) and processing the samples of at least some of said antenna signals to form a plurality of (M+1) basis signals (y_0..., y_M), each having R dimensions, said (M+1) basis signals together having fewer space-time dimensions (Rx(M+1)) than the space-time dimensions (NxL) of the (N) combined antenna signals, where L is the maximum of the channel response in symbol periods, and

a plurality (M+1) of signal processing units (60_0 ... 60_M) for processing said basis

signals to form said set of (M+1) user-specific estimated received signals (z_0,..., z_M), each signal processing unit having a plurality of inputs coupled to the common preprocessing section for receiving all of the (M+1) basis signals, each signal processing unit processing and combining at least some of said (M+1) basis signals (y_0..., y_M) to produce a respective one of [[a]] said set of user-specific estimated received signals (z_0,..., z_M) [[each]] for a corresponding desired one of the plurality (M+1) of transmitting users,

the common preprocessing section comprising

filtering means (40) for combining all of the antenna signals (x_1, x_2,..., x_N) to provide said plurality of basis signals (y_0,..., y_M), each of the basis signals (y_0,..., y_M) comprising a different combination of the antenna signals,

~~each of the signal processing units combining the basis signals to provide a user specific output signal,~~

and updating means for periodically updating parameters of the filtering means used for deriving each particular basis signal such that each ~~user specific output signal~~ of the user-specific estimated received signals (z_0,..., z_M) will exhibit a desired optimized concentration of energy ~~of that desired user's received signal as received by the array antenna~~.

10. (Currently amended) A method of receiving signals from a plurality of transmitting users via an array antenna having *N* antenna elements providing a set of antenna signals (x_1, x_2,..., x_N), respectively, where N is at least equal to the number of users, each of said antenna signals (x_1, x_2,..., x_N) comprising information from each of the plurality of (M+1) users, to obtain a set of user-specific estimated received signals (z_0,..., z_M) each corresponding to a respective one of said transmitting users [[~~user~~]], the method comprising the steps of:

sampling each of the antenna signals;

preprocessing the samples of at least some of said antenna element signals (x_1, x_2,..., x_N) to form a plurality of (M+1) basis signals (y_0,..., y_M) each having R dimensions, said (M+1) basis signals together having fewer space-time dimensions (Rx(M+1)) than the space-time dimensions (NxL) of the (N) combined antenna signals, where L is the maximum of the channel response in symbol periods, and

processing and combining said basis signals (y_0,..., y_M) to produce a set of (M+1) user-

specific estimated received signals (z_0,..., z_M) each for a corresponding one of the plurality (M+1) of transmitting users,

the preprocessing including the steps of

combining all of the antenna signals (x_1, x_2,..., x_N) to provide said plurality of basis signals (y_0,..., y_M) such that each of the basis signals (y_0,..., y_M) comprises a different combination of the antenna signals,

~~the processing and combining step comprising the step of combining the basis signals (y_0,..., y_M) to provide a series of user-specific output signals,~~

the method further comprising the step of periodically updating parameters used for deriving each particular basis signal such that each of the user-specific ~~output signal~~ estimated received signals (z_0,..., z_M) will exhibit a desired optimum concentration of energy ~~of the received signal of that particular user as received by the array antenna~~.

11. (Previously presented) A method according to claim 10, wherein the updating step adjusts said parameters in dependence upon channel characteristics of all user channels.

12. (Previously presented) A method of receiving signals from a plurality of transmitting users via an array antenna having *N* antenna elements providing a set of antenna signals (x_1, x_2,..., x_N), respectively, each comprising information from each user, the method comprising the steps of:

sampling each of the antenna signals;

preprocessing the samples of at least some of said antenna element signals (x_1, x_2,..., x_N) to form a plurality of basis signals (y_0,..., y_M) together having fewer space-time dimensions than the space-time dimensions of the combined antenna signals,

processing and combining said basis signals (y_0,..., y_M) to produce a set of estimated received signals (z_0,..., z_M) each for a corresponding one of the users,

the preprocessing including the steps of

combining all of the antenna signals (x_1, x_2,..., x_N) to provide said plurality of basis signals (y_0,..., y_M) such that each of the basis signals comprises a different combination of the antenna signals,

the processing and combining step comprising the step of combining the basis signals (y_0,..., y_M) to provide a series of user-specific output signals,

the method further comprising the step of periodically updating parameters used for deriving each particular basis signal such that each user-specific output signal will exhibit a desired optimum concentration of energy of the received signal of that particular user as received by the array antenna,

wherein the updating step adjusts said parameters in dependence upon channel characteristics of all user channels, each step of processing the basis signals weights the basis signals before combining same, and adjusts the weights in dependence upon channel characteristics of all user channels, and wherein the parameters are updated less frequently than the weights.

13. (Previously presented) A method according to claim 10, wherein the number of basis signals is equal to the number of desired user signals.

14. (Currently amended) A method according to claim 10, wherein the step of preprocessing the samples uses M+1 dominant subspace filters to produce a set of basis signals $\mathbf{y}_m = [y_{m,1}, ..., y_{m,\mu}]$ where m is the index of the filter, and m = 0, 1, ..., M, said basis signals $\mathbf{y}_m$ being projections of the input signals ($x_{11}, x_{12}, ..., x_{1L}, x_{21}, x_{22}, ..., x_{2L}, ..., x_{N1}, x_{N2}, ..., x_{NL}$) onto the [[~~R~~]] R dimensions of the subspace occupied by signal m which carry the most energy.

15. (Previously presented) A method of receiving signals from a plurality of transmitting users via an array antenna having *N* antenna elements

providing a set of antenna signals ($x_1, x_2,..., x_N$), respectively, each comprising information from each user, the method comprising the steps of:

sampling each of the antenna signals;

preprocessing the samples of at least some of said antenna element signals ($x_1, x_2,..., x_N$) to form a plurality of basis signals ($\mathbf{y}_0,..., \mathbf{y}_M$) together having fewer space-time dimensions than the space-time dimensions of the combined antenna signals,

processing and combining said basis signals ($\mathbf{y}_0,..., \mathbf{y}_M$) to produce a set of estimated received signals ($z_0,..., z_M$) each for a corresponding one of the users,

the preprocessing including the steps of

combining all of the antenna signals ($x_1, x_2,..., x_N$) to provide said plurality of basis signals ($\mathbf{y}_0,..., \mathbf{y}_M$) such that each of the basis signals comprises a different combination of

the antenna signals,

the processing and combining step comprising the step of combining the basis signals (y_0,..., y_M) to provide a series of user-specific output signals,

the method further comprising the step of periodically updating parameters used for deriving each particular basis signal such that each user-specific output signal will exhibit a desired optimum concentration of energy of the received signal [[~~if~~]] of that particular user as received by the array antenna,

the method further comprising the step of generating a training sequence for each user,

the updating step being responsive to the training sequence of a particular user and the antenna signals to provide a covariance matrix embodying long-term statistics for the channel of that user, and using eigenvector estimation means for extracting from said covariance matrix at least the dominant eigenvector, elements of said dominant eigenvector being employed for updating said parameters.

16. (Previously presented) A method according to claim 10, wherein the step of combining all of the antenna signals uses a plurality of filters each matched to a respective one of the desired users.

17. (Previously presented) A method of receiving signals from a plurality of transmitting users using an array antenna having an array of antenna elements and a receiver comprised of a common prefiltering section followed by a plurality of receiver sections, each corresponding to a different one of the users and coupled to the outputs of the common prefiltering section, the method comprising the steps of

(i) maintaining through periodic updates a set of dominant subspace filters, each matched to one of the users of interest, and the outputs of which being used by the subsequent receiver sections, to be processed and combined in order to yield an estimate of the desired signal for each user of interest;

(ii) periodically estimating and/or updating the component weights of the dominant subspace filters by correlation with at least one of (a) a known training sequence, (b) the user's spreading code where the method is used in a CDMA system, and (c) any other signal strongly correlated with the signal of the user of interest, in combination with appropriate temporal averaging to

isolate subspace-level information, as opposed to instantaneous channel characteristics; and

(iii) periodically or dynamically estimating and/or updating the component weights and/or any other parameters of interest of the receiver sections fed from the prefiltering section in a manner and at a rate such that instantaneous channel changes are tracked to provide a reliable and consistent estimate of the desired signal.